

2.7

Rational Zeros Theorem, Finding Rational Zeros, Upper & Lower Bounds, Descartes' Rule of Signs

Name _____ Date _____ Period _____

Use the Rational Zeros Theorem to write a list of all potential rational zeros.

1. $f(x) = 6x^3 - 5x - 1$

2. $f(x) = 2x^3 - x^2 - 9x + 9$

3. $f(x) = 3x^3 - 7x^2 + 6x - 14$

4. $f(x) = 6x^4 - x^3 - 6x^2 - x - 12$

Use synthetic division to see if the number k is an upper or lower bound for the real zeros of $f(x)$ and state why it is an upper or lower bound.

5. $k = 0; f(x) = x^3 - 4x^2 + 7x - 2$

6. $k = 2; f(x) = x^4 - x^3 + x^2 + x - 12$

7. $k = -1; f(x) = 3x^3 - 4x^2 + x + 3$

8. $k = 3; f(x) = 2x^3 - 4x^2 + x - 2$

Use Descartes' Rule of Signs to determine the possible number of positive and negative real zeros of the function.

9. $P(x) = 9x^3 - 4x^2 + 10$

10. $f(x) = 5x^4 + x^2 - 3x - 2$

11. $f(x) = 2x^3 + x - 3$

12. $f(x) = x^3 + x^2 + x + 1$

Find all of the real zeros of the function, finding exact values whenever possible. Identify each zero as rational or irrational.

13. $f(x) = 2x^3 - 3x^2 - 4x + 6$

14. $f(x) = x^3 + 3x^2 - 3x - 9$

15. $f(x) = x^3 + x^2 - 8x - 6$

16. $f(x) = x^3 - 6x^2 + 7x + 4$

17. $f(x) = x^4 - 3x^3 - 6x^2 + 6x + 8$

18. $f(x) = 2x^4 - 7x^3 - 2x^2 - 7x - 4$

Practice Problems

Simplify.

19. $(-2i)(2i)$

20. $(x - 7i)(x + 7i)$

21. $(x - 3 - 2i)(x - 3 + 2i)$